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SAPC-5650
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26 April 1956

MEMORANDUM FOR : Project Director

SUBJECT : Thermal Radiation Reconnaissance System Proposed by Hycon

A. PROBLEM

To investigate the feasibility of providing a High Resolution Thermal Reconnaissance Device for gathering intelligence information by Project Aquatone.

B. DISCUSSION

1. As an outgrowth of President Eisenhower's "Atoms for Peace" proposal to the USSR and other nations, the E. O. Lawrence Committee requested the USAF to investigate several methods which might enable the US to monitor USSR atomic energy activities by overflights. Such overflights would be done only after approval for same would be given by USSR. [redacted] was given the project to determine the capabilities and limitations of several detection methods, one of which involved thermal radiation detection devices. [redacted] has been studying the current state of the art to include possible equipment capabilities one year into the future. 25X1 25X1

2. Since I have no data available from which I might evaluate the Hycon proposal, I obtained information from [redacted] on the results they have ascertained to date from their studies of flight test equipment and various contractor proposals. 25X1

3. The Wright Air Development Center has conducted most of the flight testing to date of thermal radiation equipment and is providing funds for development of a number of contractor proposals on thermal radiation reconnaissance. Among the contractors proposing thermal radiation development projects to WADC are Haller, Raymond & Brown, Hycon, Servo Corp. of America, and Perkin-Elmer.

4. WADC is currently testing equipment designed by P-E for 50,000 feet. They are evaluating a Hycon proposal for equipment designed for 60,000 feet altitude, 600 knots airspeed and 20° coverage. This appears to be the same proposal we have received or is quite similar.

5. [redacted] finds the following shortcomings in equipment available to date. Similar inadequacies might be expected in equipment being developed for at least a year. 25X1

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a. Fair resolution has not been achieved above 20,000 feet altitude. Really good detail has been achieved only at 3000 to 5000 feet altitudes

b. In order to interpret what a picture presents, a normal photograph of the same area must be available. Even then a PI cannot tell for certain what a particular building or area may have operating. For instance, a factory or steel mill may radiate heat both from the building and from discharged water. Also dissimilar cooling uninhabited terrain will show "hot spots" on the film. Such cannot be interpreted except by checking with daylight or other types of correlating photographs.

[redacted] 25X1

d. The area of coverage laterally and along the flight path is less than we can achieve through present and forthcoming conventional aerial photography. This would require many more flight paths to be made by the airplane to get area coverage made by one flight path using our normal visual camera configurations.

e. Although daylight thermal radiation photography can be taken, maximum thermal detectivity is optimum at night. If light conditions and visual night photography can be realised, concurrent thermal radiation photography might somewhat supplement the intelligence take.

[redacted] 25X1

6. From my understanding of the Hycon proposal, they are estimating eight months to produce the High Resolution Thermal Reconnaissance Device for Aquatone. As we all know, they have failed to meet their estimated equipment dates for the A-1, A-2, and B camera configurations. It seems quite unlikely that they will be able to take on such a new project and meet time schedules with their current shortage of engineering and technician talent.

C. CONCLUSIONS

1. High Resolution Thermal Reconnaissance Devices have not exhibited good resolution at 20,000 feet. While development surely will increase the high altitude resolution capability, such is too

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far in the future for Aquatone.

2. Thermal reconnaissance alone is limited in its value for Aquatone.

3. Evaluation of a thermal radiation "map" is extremely difficult.

4. Thermal radiation "maps" would almost of necessity from a PI viewpoint have to be used as a supplement to a visual photograph.

5. Area of coverage by thermal radiation equipment is much less per flight path than is obtainable by visual photographic systems.

6. Thermal radiation mapping is most suitable for night exploitation.

7. As a supplement to other methods of reconnaissance contemplated for Aquatone, it presents another item of equipment to add to our presently burdensome systems numbers.

8. WADC is presently fostering the research and development of high resolution thermal detection devices for high altitude reconnaissance; so the state of the art is being furthered.

D. RECOMMENDATIONS

1. [redacted] to notify Hycon that we do not propose to contract with them per their proposal for thermal radiation reconnaissance equipment for Aquatone. 25X1

2. That we not contemplate using thermal radiation reconnaissance until we can determine a need exists for such specialized, limited type of equipment, or until the state of the art develops to such a degree that its high altitude resolution and "map" interpretation show a great deal more promise than predictions now foretell.

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[redacted]
Colonel, USAF
Deputy Project Director

CONCUR in this recommendation and request the Contracting Officer to notify Hycon.

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[redacted]
Project Director

1 May 1956

1 - RMB
2 - GFK
3 - JAG
4 - Reading
5 - Chron.

JAG/hh